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DIVISION INTO PEDOGEOGRAPHIC DISTRICTS AS TAXONOMICAL AND TERRITORIAL BASE FOR GEOGRAPHIC INFORMATION SYSTEMS

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Abstract: The article presents the topographic, climatic and soil characteristics of the pedogeographical zones for the territory of the Republic of Moldavia. We focus on the usefulness of Geographic Information Systems in creating and mentaining a pedogeographical database potentially usable in many fields of research, such as the landscape geoecological assessment.

Key words: pedogeographic districts, GIS

Geographic Information Systems can be used for various purposes and for different administrative units, counties, etc. Administrative territorial units, generally, contain fragments of different natural regions. For this reason these systems are heterogenous and does not point out regional peculiarities that are conditioned of the specific natural conditions. A more relevant information upon geographic environment are within GIS projects developed for certain natural regions – areas, districts, etc. These systems can create a detailed and also a holistic image of the territorial natural conditions and its ecological essence.

The limits or the borders of the natural regional units are, often, conventional. These borders are, as a rule, on natural courses like – rivers, ridges, watershed limits, but where the lack, are made in a conventional way. More objective and argumented are the limits of the pedogeographic taxonomical units, which are made by using pedological maps for various soils delimitation.

In the Moldova Republic pedogeographic zoning was made for all taxonomic levels [6]. For territorial units delimitation were used pedological maps at scales 1:200,000 and 1:50,000.

The Republic territory was divided in 3 areas, 7 districts, 14 regions and 11 pedogeographic subregions. Within regions and subregions were identified 80 microregions, grouped in 8 geoecological units. All taxonomic levels were completely characterized, and the composition of the soilscape was computed at subtype level [2,5,6].

The north part of the Republic belongs to the East-european silvosteppe. There on the hills are located grey soils (tipical and mollic), and in the rest of the area dominates levigated chernozems, typical chernozems with moderate content

of humus. The hilly region in the center of the Republic displays an insulated fragment of the central European area of forest composed of beech and evergreen oak on brown and grey soils. The south plain diplays an area of a xerophitic steppe on typical chernozems with low content of humus and carbonatic [2].

Table 1. *Topography parameters of the pedogeographic regions and subregions of the Northern silvosteppe area*

Region, subregion	Name	Altitude, m				Average length of the hillslopes, m	surface (%) with slope			
		max	min	dominant	average		0-2°	2-6°	6-10°	10°
1	Raionul silvostepei Podişului de Nord	311	54	200-240	213	600	55	30	10	5
2	Raionul silvostepei Dealurilor Prutului Mijlociu	270	40	140-200	162	800	45	38	12	5
3	Raionul stepei Câmpiei Bălților	291	80	160-200	168	700	50	40	7	3
3a	Subraionul stepei Dealurilor Ciulucului	350	40	120-160	138	700	30	45	15	10
3b	Subraionul silvostepei Dealurilor Solonețului	340	40	150-200	157	1000	40	35	15	10
3c	Subraionul stepei teraselor Prutului Mijlociu	240	33	80-150	109	800	55	30	10	5
4	Raionul silvostepei Dealurilor Sorocii	347	30	160-240	181	750	40	37	15	8
5	Raionul silvostepei Dealurilor Rezinei	338	12	160-240	198	1000	30	45	15	10
6	Raionul stepei Câmpiei Nistrului Mijlociu	274	30	120-220	142	300	50	30	10	10

Pedogeographic areas are quite different by their geomorphological, geological and climatic structure. The most important parameters of the pedogeographic areas includes topographic parameters (median, maximum and minimum altitudes, the length of the hillslopes, slope) and climatic parameters.

The indices of all these factors were calculated for each pedogeographic region. At the same time, were calculated the soil surfaces for each soil sype, subtype and level of erosion.

As an example of complex characterization of one territorial unit, as a base for a SIG project, that can be used for pedogeographic area for the Northern Moldova silvosteppe. This area displays a mix of pedogenetic factors as topography, parental rocks, climate, vegetation and soils.

Table 2. *Climatic parameters of the pedogeographic regions and subregions of theNorthern silvosteppe area (average multiannual data)*

Region, subregion	Temperature, °C					Length of period with no frost, (days)	Precipitation, mm			Aridity index
	year	Jan	max.	min.	sum t >10°		year	December-March	April – November	
1	7,7-7,8	-4,8-5,2	38	-34	2735-2745	168-171	456-551	96-112	360-439	0,76-0,84
2	8,2-8,6	-4,4-4,8	39	-34	2880-3040	169-176	451-460	91-97	360-364	0,68-0,74
3	8,7-8,9	-4,4	39	-35	3000-3115	163-192	445-484	93-101	359-383	0,64-0,68
3a	8,3-8,4	-4,5	39	-35	3000	163	459-475	95-97	362-380	0,55-0,68
3b	8,9	-4,2	39	-31	3085	176	470-483	97-101	373-382	0,64-0,68
3c	8,9	-4,4	39	-31	3180	182	445	102	343	0,58-0,64
4	8,5-8,6	-4,4-4,6	39	-35	2920-3100	180	479	100	379	0,64-0,68
5	9,0	-4,0	40	-32	3125	180	473-486	98-108	362-388	0,64-0,68
6	8,5-8,6	-4,4-4,6	39	-33	3050	175	440-475	92-100	348-375	0,55-0,68

Tabelul 3. *Soil surfaces of the pedogeographic regions and subregions of the Northern silvosteppe area*

Region, subregion	surface (w/a villages) thousand ha	Grey soils				Chernozems										Verticols, vertiv chernozems and salted soils		Rendzinas and skeletal chernozems		Moderate and strong eroded soils		Soils affected by gullies and landslides		Chernozem-like soils, swamps and deluvial soils		Alluvial soils	
		Albic and typical		mollic		argiloilluvial		levigated		Typical, with moderate content of humus		Typical, with low content of humus		Carbonatic													
		ha	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*	*ha*	*%*
1	248,6	23,3	9,4	37,4	15,0	41,2	16,6	48,3	19,4	16,6	6,7	6,1	2,9	0,8	0,3	1,1	0,4	3,7	1,5	45,5	18	5,8	2,3	8,6	3,5	9,2	3,7
2	131,0	2,5	1,9	5,7	4,4	10,2	7,8	11,0	8,4	22,2	16,9	6,1	4,7	1,9	1,4	1,3	1,0	1,6	1,2	36,4	28	8,4	6,4	5,7	4,4	18	14
3	269,7							37,0	13,7	76,6	28,4	41,5	15,4	14,8	5,5	4,8	1,8	2,9	1,1	55,4	21	12,3	4,6	13	4,8	11	4,2
3a	58,0							0,4	0,7	11,4	19,6	7,1	12,2	2,0	3,4	6,3	10,9	0,3	0,6	17,5	30	5,5	9,4	4,3	7,5	3,2	5,6
3b	76,5	0,6	0,8	0,9	1,2	1,3	1,7	3,6	4,7	16,2	21,2	6,2	8,1	5,1	6,6	1,7	2,2	0,2	0,3	27,6	36	3,3	4,3	6,4	8,4	3,4	4,4
3c	51,6					0,2	0,3	0,2	0,3	1,7	3,3	13,4	26,0	2,6	5,1	1,1	2,1			18,3	36	7,8	15	1,3	2,5	5	9,7
4	79,0	5,1	6,5	10,3	13,0	9,0	11,4	11,9	15,0	1,7	8,8	2,9	3,7	3,0	3,8	0,2	0,3	0,2	0,3	21,9	28	3,8	4,8	2,7	3,4	1	1,3
5	236,8	14	5,9	30,1	12,7	20,2	8,5	25,2	10,7	7,0	4,7	6,6	2,8	11,9	5,0	1,2	0,5	6,4	2,7	81,1	34	4	1,7	12	4,9	13	5,7
6	158,0			1,0	0,6	2,3	1,5	12,5	7,9	19,1	12,0	24,0	15,2	42,0	26,6	1,1	0,7	10,5	6,7	34,2	21	0,3	0,2	5,9	3,7	5,1	3,2
7	1309,2	45,5	3,5	85,4	6,5	84,4	6,5	150,1	11,5	18,9	13,9	114,9	8,8	84,1	6,4	84,1	6,4	25,8	2,0	338	26	51,2	3,9	60	4,5	70	5,3

The top of the hills, that are dominant in the relief, where average rainfall is over 600 mm/year, former occupied by forests – evergreen oak and oak- under which, on ditric sarmatian rocks were formed grey soils, and under meadow vegetation levigated chernozems were formed. In the areas with lower average altitude with dominance of loessy clay, under meadows were formed

typical chernozems with a moderate content of humus, on calcareous rocks – rendzinas, in the floodplains – alluvial soils.

Territorial heterogeneity of the pedogenetic factors determined some differentiation, its splitting in 6 regions and 3 pedogeographic subregions. The compex properties of these territorial units are displayed in tables (1,2,3). This kind of computing were made for all the areas and pedogeographic regions of the Republic of Moldova.

GIS can have factual content, both quantitative and qualitative, however, they can have a much broader use when relying on objects that are characterized exhaustively. Pedogeographic regions are territorial units with specific conditions. Financial resources, complex planning for higher productivity, environmental protection, etc. will be more efficient when considering natural local conditions and factors. Soil regional peculiarities, the territorial units complexity were used as a base for vineyard [3], fruit trees [4] and antierosional zoning [1]. Pedogeographical zoning will be considered for landscape geoecological assessment.

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